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Trance Logic as Incomplete Responding

Nicholas P. Spanos, Hans P. de Groot, and Maxwell I. Gwynn
Carleton University, Ottawa, Ontario, Canada

Two experiments tested predictions derived from the logical incongruity and differential demands hypotheses of trance logic responding. In Experiment 1, subjects that were highly susceptible to hypnosis showed higher levels of responding on three trance logic indexes (i.e., transparent hallucinating, duality, incongruous writing in age regression) than did subjects low in susceptibility to hypnosis who were instructed to fake hypnosis (i.e., simulators). In line with the differential demands hypothesis, hypnotic "reals" were less likely than simulators to report believing in the reality of the suggested situations and were less likely to report fine details in their hallucinations. Also consistent with the differential demands hypothesis (but inconsistent with the logical incongruity hypothesis), rate of trance logic responding correlated negatively with the degree to which hypnotic reals rated themselves as subjectively experiencing suggested effects, and as becoming absorbed in suggestions. Experiment 2 found that highly susceptible hypnotic and nonhypnotic subjects (collectively called "reals") responded equivalently on all suggestions. High- and low-susceptible simulators also performed equivalently on all suggestions. Consistent with the differential demands hypothesis (but not the logical incongruity hypothesis), (a) trance logic indexes differentiated reals from simulators when these indexes also measured incomplete subjective responding, and (b) trance logic indexes that failed to measure incomplete responding also failed to differentiate reals from simulators. The findings of both experiments are more consistent with social psychological views than with special processes views of hypnotic responding.

In an influential early study, Orne (1959) compared the response to a visual hallucination suggestion in highly susceptible hypnotic subjects (i.e., "reals") and subjects low in susceptibility to hypnosis who had been instructed preexperimentally to fake deep hypnosis (i.e., simulators). During their experimental session, all subjects were administered the same hypnotic procedures, suggestions, and interviews. During their hypnotic session, all subjects sat facing a coexperimenter. While the subjects' eyes were closed, the coexperimenter rose from his chair and moved from the subjects' field of view. Subjects were then instructed to open their eyes and to "see" (i.e., hallucinate) the coexperimenter still sitting in the chair. After the subjects described their hallucinated image, the hypnotist pointed to the actual coexperimenter and asked the subjects what they saw. Orne (1959) reported that some of the hypnotic reals but none of the simulators spontaneously indicated that they could simultaneously see the coexperimenter and see through him (i.e., transparency response). Relatedly, when faced with the actual coexperimenter, hypnotic reals were much more likely than simulators to report seeing two images of the coexperimenter at the same time (i.e., double hallucination response). According

to Orne (1959), both the transparency and double hallucination response reflect trance logic; a stable tendency on the part of the hypnotic reals (but not simulators) to freely mix percepts and internally generated images with the subjects showing little concern for the difference between the two.

Seven studies have replicated Orne's (1959) findings concerning the transparency response (Johnson, Maher, & Barber, 1972; McDonald & Smith, 1975; Peters, 1973; Sheehan, Obstoj, & McConkey, 1976; Spanos, Bridgeman, Stam, Gwynn, & Saad, 1983; Spanos, de Groot, Tiller, Weekes, & Bertrand, 1985; Stanley, Lynn, & Nash, 1986). In all of these studies, real hypnotic subjects were more likely than simulators to report their visual hallucinations as transparent. This effect occurred despite differences between the studies in the object to be hallucinated and the procedures used to assess transparency (e.g., answers to open-ended questions, ratings of degree of transparency). On the other hand, studies have consistently failed to replicate Orne's (1959) findings concerning the double hallucination response (Blum & Graef, 1971; Johnson et al., 1972; McDonald & Smith, 1975; Peters, 1973; Sheehan et al., 1976; Spanos, de Groot, et al., 1985). Instead, these studies found no significant differences in the frequency of the double hallucination response in hypnotic reals and simulators.

Since Orne's (1959) initial study, a number of tests other than the transparent and double hallucination have been used to index trance logic. For instance, trance logic has been scored as present if the subjects who accepted the suggestion that an ob-

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Correspondence concerning this article should be sent to Nicholas P. Spanos, Department of Psychology, Carleton University, Ottawa, Ontario, Canada K1S 5B6.

ject was missing from the room walked around, rather than bumped into the "missing" object (Obstoj & Sheehan, 1977; Peters, 1973), or if subjects that were age regressed to childhood had correctly spelled difficult words (i.e., incongruous writing; Peters, 1973). Most of these new trance logic measures have failed to successfully differentiate between hypnotic reals and simulators (Peters, 1973; Spanos, de Groot, et al., 1985; Stanley et al., 1986). One partial exception to this generalization concerns incongruous writing in age regression. Although Peters (1973) and Stanley et al. (1986) reported no significant differences between hypnotic reals and simulators on this item, four other studies (McConkey & Sheehan, 1980; Nogrady, McConkey, Laurence, & Perry, 1983; Perry & Walsh, 1978; Spanos, de Groot, et al., 1985) reported significantly more incongruous writing for hypnotic reals than for simulators.

In four recent studies (Laurence & Perry, 1981; Nogrady et al., 1983; Perry & Walsh, 1978; Spanos, de Groot, et al., 1985) another aspect of response to age regression suggestions was found to differentiate between hypnotic reals and simulators. Reals were significantly more likely than simulators to report that they alternated between feeling like a child and feeling like an adult during the age regression period. Following Orne (1951), Perry and Walsh (1978) labeled these shifts in perspective *duality responses*. They suggested that duality responding, like trance-logic responding, reflects a tolerance for incongruity on the part of highly susceptible hypnotic reals.

In summary, only three responses associated with the notions of trance logic or tolerance for incongruity more or less reliably differentiate hypnotic reals from simulators. These responses are transparent hallucinating, incongruous writing in age regression, and duality reports in age regression. Most of the responses devised to index trance logic (e.g., double hallucination response, walking around a "missing" object) have consistently failed to differentiate hypnotic reals from simulators.

Interpretation of Real/Simulator Differences

All of Orne's (1959) subjects were exposed to the same hypnotic induction and testing procedures during their experimental session. Orne (1959) therefore argued that his real hypnotic subjects and simulators were exposed to the same demand characteristics and that the only important difference between these treatments was the presence of a hypothesized hypnotic state in the reals and the absence of that state in the simulators. Consequently, Orne (1959) attributed the behavioral differences found between reals and simulators to a characteristic of the hypothetical hypnotic state, that is, trance logic.

Contrary to Orne's reasoning, it now seems clear that hypnotic reals and simulators are exposed to very different experimental demands (Sheehan, 1970, 1971). It was recently suggested that different demands, rather than the characteristics of a hypothetical hypnotic state, may account for the differences in trance logic responding characteristically found between hypnotic reals and simulators (Spanos, 1986; Spanos, de Groot, et al., 1985; Spanos & Stam, 1979; Wagstaff, 1981a, 1981b). According to this differential demands hypothesis (Spanos, 1986), highly susceptible hypnotic reals are motivated to carry out the behaviors and experiences called for by test suggestions. These subjects tend to take seriously the definition of the situa-

tion as a scientific experiment. They are therefore constrained by implicit demands for honesty to align their behavior with their subjective experiences and also to report accurately about what they experienced. Many test suggestions, like those for visual hallucination and age regression, are difficult. Even highly susceptible hypnotic reals have difficulty maintaining the requisite subjective effects throughout the entire suggestion period (Spanos & Radtke, 1981). Consequently, these subjects often respond incompletely to difficult test suggestions and, afterward, they are honest in describing their incomplete responses to the experimenter. Thus, according to this hypothesis, transparent (rather than solid) hallucinating, adult (rather than childlike) writing in age regression, and duality experiences (rather than feeling consistently childlike) during age regression, reflect more or less honest reporting about incomplete responses made to difficult test suggestions.

The faking instructions given to simulators warn them against trying to experience subjective effects and explicitly direct them to ignore demands for honesty. Because simulators are instructed to fake behaving like excellent, deeply hypnotized people, they typically give the appearance of making complete rather than incomplete responses to even difficult test suggestions (Levitt & Chapman, 1979; Spanos, 1986; Wagstaff, 1986). A complete or ideal response to a visual hallucination suggestion is a clear, vivid, solid image that looks like the "real thing," while a complete age regression response involves acting and feeling childlike throughout the entire suggestion period. Because simulators tend to fake ideal responses, they rarely report transparent hallucinations or adult feelings during age regression and tend not to revert to adult behavior (i.e., correct spelling) during age regression (Spanos, 1986).

Empirical Findings

Three interrelated sets of findings provide support for the differential demands hypothesis but are less consistent with the tolerance for incongruity hypothesis. A number of studies (Johnson et al., 1972; Obstoj & Sheehan, 1977; Spanos et al., 1983; Spanos et al., 1985) compared hypnotic reals with nonhypnotic subjects who were encouraged to experience suggested effects and were not instructed to fake their responses (i.e., nonhypnotic reals). In all of these studies, hypnotic and nonhypnotic reals responded in the same way to trance logic items. Moreover, nonhypnotic reals, as were hypnotic reals, were more likely than simulators to exhibit transparent hallucinating, duality in age regression, and incongruous writing in age regression. In short, these findings indicate that trance logic responding is as likely to occur in nonhypnotic as in hypnotic subjects and is therefore not unique to or even facilitated by hypnotic procedures.¹

¹ Johnson, Maher, and Barber's (1972) conclusion concerning equivalent trance logic responding in hypnotic and waking control subjects was challenged by Hilgard (1972) who conducted a reanalysis of Johnson et al.'s data. In his rebuttal, however, Johnson (1972) pointed out that Hilgard's (1972) reanalysis contained a computational error that vitiated his criticisms. As indicated in the text, all subsequent studies on this issue have supported Johnson et al.'s (1972) finding that hypnotic and waking control subjects perform equivalently on trance logic tasks.

Hypnotic and nonhypnotic reals show wide variability in the intensity of their subjective response to visual hallucination suggestions. A few of these subjects report that their hallucinated images were solid and lifelike rather than transparent. Most, however, report that their images were transparent and that they were nonlifelike in other ways as well (e.g., vague, fuzzy, incomplete, of short duration; Spanos, Bridgeman, et al., 1983; Spanos, Ham, & Barber, 1973; Spanos, Churchill, & McPeake, 1976). Thus, the transparency reports characteristic of most real subjects may simply reflect the fact that for most people, visual imagery generated with eyes open tends to be nonlifelike on many dimensions, including the dimension of solidity-transparency. Because hypnotic and nonhypnotic reals tend to be constrained by norms for honest reporting, they tend to accurately describe their hallucinated imagery as transparent as well as nonlifelike in other respects (Spanos & Radtke, 1981).

Following a suggestion to *see* a book, Spanos, Bridgeman, et al. (1983) found that simulators were significantly more likely than hypnotic and nonhypnotic reals to describe the hallucinated book as possessing the qualities of a real book (e.g., color, definite location, and solidity). On the other hand, hypnotic and nonhypnotic reals were more likely than simulators to qualify their descriptions of the hallucinated book with terms such as *not real*, *fuzzy*, and *vague*. This pattern of differences in description is clearly consistent with the differential demands hypothesis (Spanos, 1986). According to that hypothesis, reals reported more or less accurately about the incomplete characteristics of their imagery response while simulators tended to lie by describing an ideal visual hallucination that possessed the qualities of a real book.

This study includes two experiments that further test the differential demands and logical incongruity hypotheses of trance logic responding.

Experiment 1

According to Orne (1959, 1979), hypnosis involves responses to suggestion that are experienced as subjectively compelling. As previously indicated, Orne (1959) also described trance logic as the "essence" of hypnosis. Taken together, these two descriptions of hypnosis generate a clearcut prediction concerning response to those trance logic items that successfully discriminate reals from simulators. Trance logic responses to those items should occur most frequently in those hypnotic reals who report the most subjectively compelling responses to the items (i.e., who are most deeply hypnotized). Alternatively, the differential demands hypothesis predicts that the frequency of trance logic responding to those items should be negatively correlated with the subjective intensity of the subjects' response, and should be negatively correlated with the degree of credibility that the subjects assign to their suggested experiences.

Experiment 1 assessed these ideas by comparing highly susceptible hypnotic reals and low susceptible simulators on response to visual hallucination and age regression suggestions. The responses of subjects who passed the hallucination item were scored for transparency, and the responses of those who passed the age regression suggestion were scored for incongruous writing. The subjects' responses to suggestion were videotaped. Following each suggestion, subjects were shown the vid-

eotapes of their own responses and, using the Experiential Analysis Technique (EAT; Sheehan, McConkey, & Cross, 1978), were interviewed about their experience during each response. On the basis of their EAT testimony, subjects were rated as believing or not believing in the reality of their hallucinated image and as believing or not believing that they were the age suggested. The subjects' interview testimony was also rated for duality responding during age regression and for whether they reported seeing fine details (e.g., eyebrows) in the hallucinated object. Following their EAT, subjects rated the subjective intensity of each suggested response and their degree of absorption in each response.²

On the basis of previous findings, we predicted that hypnotic reals would be significantly more likely than simulators to exhibit transparent hallucinating, incongruous writing, and duality during age regression. On the basis of the differential demands hypothesis, we predicted that simulators would be more likely than reals to describe their suggested experiences as believed in and to report seeing fine details in their hallucinations. Moreover, among hypnotic reals we anticipated that those who described their suggested experiences as believed in would be (a) less likely than those who did not to exhibit transparency, duality, and incongruous writings and (b) more likely than nonbelievers to report seeing fine details in the hallucinated object. Finally, we predicted that summed transparency, duality, and incongruous writing responses would correlate negatively with subjective intensity and absorption in suggestion ratings.

Method

Subjects. Fifty-six Carleton University undergraduates (22 male, 34 female) volunteered to participate either for course credit or for \$4 in a single-session hypnosis experiment. All subjects had been previously tested on the objective dimension of the Carleton University Responsiveness to Suggestion Scale (CURSS; Spanos, Radtke, Hodgins, Stam, & Bertrand, 1983c) and had been classified as either high ($n = 28$) or low ($n = 28$) in susceptibility (CURSS scores of 5 to 7 or 0 to 2 respectively).

The CURSS is a standardized 7-item instrument for assessing responsiveness to hypnotic suggestions. The psychometric properties of the scale and information concerning its relationship to other susceptibility scales are presented elsewhere (Spanos, Radtke, et al., 1983a, 1983b, 1983c; Spanos, Salas, Menary, & Brett, 1986). The CURSS has adequate reliability and correlates with other commonly used susceptibility scales as highly as those scales correlate with one another. Because the CURSS is a relatively difficult scale, it is particularly useful as a group measure for identifying highly susceptible subjects. The CURSS has successfully discriminated the performance of high and low susceptibles on a wide variety of individually suggested phenomena (e.g., hallucination: Spanos, Bridgeman, et al., 1983; analgesia: Spanos, Ollerhead, & Gwynn, 1986; amnesia: Spanos, de Groh, & de Groot, 1987).

In order to ensure that hypnotic reals are high in susceptibility, Orne (1979) recommends screening them on more than one susceptibility scale. This practice has been followed in only two trance logic studies (McDonald & Smith, 1975; Peters, 1973), and the pattern of real/simu-

² In both Experiments 1 and 2, all subjects were administered a baseline trial of finger pressure pain before administration of the hypnotic induction procedure. Later in the session, all subjects were administered a hypnotic analgesia suggestion and several other finger pressure pain trials. The results of the pain testing will be discussed in a subsequent paper.

lator differences in those studies was the same as the pattern of real/simulator differences in studies that selected and labeled certain subjects as high in susceptibility on the basis of only a single test (e.g., Sheehan et al., 1976; Spanos, de Groot, et al., 1985). Moreover, Stanley et al. (1986) specifically compared trance logic responding in subjects who had been screened as high susceptibles on the basis of either a single susceptibility test or two susceptibility tests. Subjects in the two groups who passed the criterion suggestions exhibited equivalent levels of trance logic. In short, the available data provide no support for the hypothesis that high susceptibles selected on the basis of multiple screenings perform differently on trance logic tasks than do high susceptibles selected on the basis of a single screening.

Procedure. All of the high susceptibles were assigned to a real hypnotic treatment and all of the low susceptibles were assigned to the simulation treatment. Upon their arrival at the laboratory, all subjects were greeted by an assistant who was aware of their susceptibility level. The assistant informed the high susceptibles that they would be hypnotized, obtained permission to videotape their responses, escorted them to the experimental room, and introduced them to the hypnotist/experimenter. Permission to videotape was also obtained from the low susceptibles. However, these subjects were also administered instructions adapted from Orne (1979) that encouraged them to fake behaving like an excellent hypnotic subject in order to fool the hypnotist. Simulators were informed (accurately) that the hypnotist knew that some subjects would be faking and some would not, but he did not know who was who. They were also told that the hypnotist would stop the session if he guessed that they were faking. Therefore, as long as he did not stop the session, they were to continue doing everything they could to fool him. Simulators were informed that their task was a difficult one but that other intelligent subjects had been able to fake hypnosis successfully. They were instructed to fake throughout the EAT interview and on all postexperimental questionnaires and to continue faking until they were returned to the assistant and were told by him to stop faking.

Trance Logic Tests

All subjects were tested individually by the same male experimenter. The experimenter was blind to subjects' treatment assignment, and all subjects received the same hypnotic induction procedure, test suggestions, EAT interview, and postexperimental questionnaires. The subjects were administered a 5-min hypnotic induction procedure modified from Barber (1969), followed by a suggestion for age regression and a suggestion for visual hallucination given in counterbalanced order. For both suggestions, the scoring of a response for trance logic always involved a two-step process. Subjects were first scored for whether they accepted (passed) or did not accept (failed) the suggestion. Only subjects who passed the age regression suggestion were scored for duality and incongruous writing, and only those who passed the hallucination suggestion were scored for transparency and for whether they reported seeing fine details in their hallucinations. Relatedly, subjects were scored as believing in or not believing in their suggested experiences only if they first passed the suggestion in question.

Age regression. Subjects were given repeated suggestions taken from Laurence (1979), that they were becoming younger and were again becoming 5 years old. Following Laurence (1979), subjects were then asked their age and queried about other aspects of their age-regressed situation (e.g., "Are you going to school yet?"). Subjects were then given paper and pencil and asked to write the sentence "I am participating in a psychological experiment." Afterwards, subjects were returned to adulthood.

Subjects were scored as passing the suggestion if they reported that they were 5 years old when the experimenter asked their age. They were scored as exhibiting incongruous writing if they correctly spelled any of three key words: participating, psychological, or experiment.

Transparent hallucination. Directly in front of the subjects, perched atop a desk and leaning against a curtain, sat a toy stuffed brown moose wearing blue overalls. While the subjects' eyes were closed, the moose was quietly removed from view. The subjects were then given a suggestion modified from Peters (1973) that they would open their eyes and see the moose sitting on the desk. They were told that their right index finger would rise as they saw the moose more and more clearly. After subjects' finger had risen by at least 3 cm, they were asked to describe what they saw. They were scored as passing the hallucination suggestion if their finger rose to the requisite height and if they responded affirmatively when the experimenter asked, "Do you see the moose on the desk in front of you?"

After the subjects completed their initial description of the toy, the experimenter asked "Can you see the curtain through the toy?" Subjects were (later) scored as exhibiting transparency if they indicated that they could see the curtain through the toy.

EAT Interview and Questionnaires

Following each suggestion, the subjects were interviewed using Laurence's (1979) modification of Sheehan et al.'s (1978) EAT procedure. Unlike Laurence (1979), however, the interview was conducted by the experimenter who tested the subjects. Subjects were shown the videotape of their age-regression performance and were asked the following questions: (a) What thoughts were going through your mind at the time of the suggestion? (b) Did you really feel that you were five years old? (c) Did you have any sense of your adult identity? Two judges who were blind to the subjects' treatment condition rated their transcribed testimony for duality during age regression. Following Laurence (1979), "any report of feeling simultaneously or in alternate both adult and child was scored as a duality report" (p. 150). Interrater agreement on this dimension was 100%.

The two judges also dichotomously rated each subject's testimony for whether or not the subject believed that he or she was five years old during the age regression period. Subjects were rated as believing that they were five if they indicated subjectively compelling experiences (e.g., "It really felt like I was back there") and did not qualify their descriptions with statements indicating disbelief (e.g., "It didn't seem all that real"). Interrater agreement was 82% and discrepancies were resolved through discussion.

Finally, the two judges dichotomously rated subjects' videotaped responses to the hallucination suggestion for transparency and their EAT responses concerning the hallucination item for belief in the hallucinated object and for whether subjects reported seeing fine details (e.g., eyebrows of the moose). Interrater agreements were 98% for transparency, 86% for belief in hallucination, and 86% for fine details.

Following the EAT, subjects were administered a questionnaire that assessed their degree of subjective response to each suggestion on a 4-point subscale. For example, When I was asked to age regress to age five, I really felt that I was five years old: (a) to a great extent (scored 4), (b) moderately, (c) slightly, (d) not at all (scored 1). A total subjective experience score was obtained for each subject by summing across the subscales. The questionnaire also assessed the extent to which subjects were absorbed in each suggestion. Absorption in each suggestion was rated on a 4-point scale and a total absorption score per subject was obtained by summing across the items.

Results

Reals versus simulators. All 28 of the simulators and all 28 of the reals passed the age-regression suggestion. All 28 simulators, but only 24 of the 28 reals, the visual hallucination suggestion.

Table 1 shows that significantly more reals than simulators exhibited duality and incongruous writing in age regression and

Table 1
Incidence of Duality, Incongruous Writing, and Belief in Age Regression and Belief and Reports of Details in Visual Hallucination for Reals and Simulators

Response	Reals	Simulators	χ^2	<i>p</i>
Duality in age regression			5.79	<.05
Yes	18	9		
No	10	19		
Incongruous writing in age regression			4.38	<.05
Yes	8	2		
No	20	26		
Belief in age regression			2.63	<i>ns</i>
Yes	9	15		
No	19	13		
Belief in hallucinated object			4.38	<.05
Yes	6	15		
No	18	13		
Details in hallucination			4.16	<.05
Yes	4	12		
No	20	16		

reported transparent hallucinating. On the other hand, during the EAT interview, significantly more simulators than reals indicated belief in the hallucinated object and reported seeing fine details in their hallucination. Although more simulators (54%) than reals (32%) also indicated believing that they were really five years old during age-regression, this difference did not attain statistical significance.

Trance logic and subjective experience among reals. The differential demands hypothesis predicts that, among reals, those with the most compelling subjective experiences will be least likely to exhibit trance logic responding. In conformance with this hypothesis, Table 2 shows that reals who believe that they were five years old were significantly less likely than those who disbelieved to exhibit incongruous writing or duality responding during age regression. In fact, all of the incongruous writers were disbelievers. Relatedly, reals whose testimony indicated belief in the hallucinated object were significantly less likely than nonbelievers to report transparent hallucinating, but significantly more likely than nonbelievers to report seeing fine details in their hallucinations.

The relationship between subjective experience and trance logic responding was further assessed by summing duality, incongruous writing, and transparency responses to yield a single rate of trance logic index for each real subject. The four reals who failed the hallucination suggestion were excluded from analyses involving this index. The trance logic index correlated significantly and in a negative direction with the subjects' total subjective experience ratings, $r(22) = -.48, p < .01$, and with their total absorption ratings, $r(22) = -.47, p < .01$.

Discussion

As in most previous trance logic studies (reviewed by Spanos, 1986), we found that high susceptible reals were significantly more likely than simulators to exhibit duality and incongruous

writing in age regression and were more likely to describe suggested hallucinations as transparent. Significantly more simulators than reals reported believing that the hallucinated toy was an actual toy, and a nonsignificant trend in the same direction occurred with respect to reported belief in age regression. In fact, more than half of the simulators reported believing in each of these suggested situations, but less than a third of the reals proffered belief in either situation. Relatedly, significantly more simulators than reals reported seeing fine details in the hallucinated object. Spanos, Bridgeman, et al. (1983) also found that simulators were much more likely than high susceptible reals to report both seeing fine details and having a belief in a hallucinated object. Numerous studies (e.g., Spanos et al., 1976; Spanos, Mullens, & Rivers, 1979) reported that only a small minority of hypnotic and nonhypnotic reals assign reality status to their hallucinated images. Taken together, these findings are consistent with the hypothesis that simulators tend to fake complete or "ideal" responses, whereas reals are constrained by implicit norms for honesty and therefore tend to report more or less accurately about their incomplete responses.

The logical incongruity hypothesis predicts a positive relationship between the incidence of trance logic responding and the intensity of subjective response to suggestion in hypnotic reals. Alternatively, the differential demands hypothesis predicts a negative relationship between these variables. Our results provide clear-cut support for the differential demands hypothesis. Hypnotic reals whose testimony indicated belief in the suggested situation were significantly less likely than nonbelievers to exhibit duality, incongruous writing, and transparency responding, but were significantly more likely than nonbelievers to report seeing fine details in their hallucinations. Moreover, the summed trance logic index correlated negatively with ratings of subjective intensity and ratings of absorption in suggestions. Along similar lines, Stanley et al. (1986) found that hypnotic reals who exhibited the transparency response reported

Table 2
Relations Among Reals of Trance Logic Responding to Belief/Disbelief in Age Regression and Hallucination Suggestions to Belief/Disbelief in Hallucination

Response	Belief in age regression	Disbelief in age regression	χ^2	<i>p</i>
Incongruous writing			5.31	<.05
Yes	0	8		
No	9	11		
Duality			10.22	<.01
Yes	2	16		
No	7	3		
	Belief in hallucination	Disbelief in hallucination	χ^2	<i>p</i>
Transparent hallucination			4.13	<.05
Yes	3	16		
No	3	2		
Reports of fine details			6.40	<.05
Yes	3	1		
No	3	17		

significantly less vivid hallucinated imagery than did those who failed to exhibit transparency.

Experiment 2

The differential demands hypothesis suggests that the ability of trance logic items to discriminate reals from simulators derives primarily from their tendency to index differences in the completeness with which subjects fulfill suggested demands. Incongruous writing and transparent hallucinating involve failures to completely fulfill the demands of age regression and hallucination suggestions, respectively. Trance logic responses that fail to discriminate reals from simulators are not tied as closely to the incomplete fulfillment of suggested demands (Spanos, 1986).

According to the differential demands hypothesis, measures of incomplete responding to difficult suggestions will discriminate high-susceptible reals from simulators regardless of whether these measures are associated with the notion of trance logic. Furthermore, trance logic tests that do not index incomplete responding should not discriminate reals from simulators. Finally, among high-susceptible reals measures of incomplete responding should predict incongruous writing in age regression and transparent hallucinating, but should be unrelated to trance logic measures that fail to discriminate reals from simulators.

In order to examine these issues, we assessed the responses to four test suggestions: age regression, negative hallucination, visual hallucination, and recall amnesia. We developed a dichotomous measure of incomplete responding for each suggestion. In each case, we predicted that incomplete responding would discriminate successfully between reals and simulators. We further anticipated that trance logic responding would discriminate between these groups only when the trance logic response also indexed incomplete responding. For instance, incomplete age regression was measured directly in terms of EAT testimony indicating that the subject had not felt completely childlike during all or some of the suggestion period. Incongruous writing is a purported measure of trance logic, but according to the differential demands hypothesis, incongruous writing also indexes incomplete responding. Therefore, we predicted that both incomplete age regression and incongruous writing would discriminate reals from simulators. Incomplete negative hallucinating was indexed directly by testimony that the "missing" object had not disappeared completely. Avoiding the missing object is a measure of trance logic but is not a measure of incomplete responding. We therefore predicted that incomplete disappearance would discriminate reals from simulators, although avoidance of the missing object would not. Transparent hallucinating indexes both trance logic and incomplete responding, whereas the double hallucination response indexes trance logic but does not measure incomplete responding. We therefore predicted that transparent hallucinating would discriminate between reals and simulators although the double hallucination response would not. Response to suggestions for complete amnesia have not been associated with the notion of trance logic. Nevertheless, partial (as opposed to complete) amnesia indexes the incomplete fulfillment of suggested demands. We therefore anticipated that reals would be more likely than

simulators to exhibit partial rather than complete amnesia. In short, we predicted that incomplete responding indexes would discriminate reals from simulators regardless of whether these indexes also assessed trance logic. On the other hand, we predicted that trance logic indicators would discriminate reals from simulators only if they also indexed incomplete responding.

In previous studies (e.g., Spanos, Bridgeman, et al., 1983), simulation instructions have led to similar patterns of response in high and low susceptible subjects. These findings indicate that a set to respond to suggestions in a complete or ideal way is more closely tied to the administration of simulation instructions than to pretested levels of hypnotic susceptibility. This experiment used both low- and high-susceptible simulators, and we anticipated that these subjects would respond equivalently on all measures.

Previous studies have also reported that hypnotic and non-hypnotic reals respond in the same way to both test suggestions in general and to tests of trance logic in particular (Johnson et al., 1972; Obstoj & Sheehan, 1977; Spanos, Bridgeman, et al., 1983; Spanos, de Groot, et al., 1985). This study used both highly susceptible hypnotic reals and highly susceptible non-hypnotic reals. We anticipated that these subjects would perform equivalently on all measures.

Method

Subjects. The subjects were 72 Carleton University undergraduates who in previous testing obtained CURSS:O scores in either the high range ($N = 57$) or the low range ($N = 15$). The criteria for high and low CURSS:O scores were the same as in Experiment 1. All subjects volunteered for a single-session experiment that may or may not involve their being hypnotized, and all received either course credit or \$5 for their participation.

Procedure. High CURSS:O scorers were randomly assigned to a hypnotic real ($n = 27$), a nonhypnotic real ($n = 15$), or a high simulator ($n = 15$) treatment with the restriction that approximately twice as many highs be assigned to the hypnotic real treatment than to either of the two remaining treatments. All 15 low susceptibles were assigned to a low simulator treatment. As in Experiment 1, all subjects were initially seen by an assistant who was aware of their susceptibility level and group assignment and who either administered or did not administer the simulation instructions described in Experiment 1. All subjects were tested individually by the same male experimenter. The assistant introduced each subject to the experimenter and informed him that the subject was to receive either a hypnotic or imagination (i.e., nonhypnotic real) condition. Thus, the experimenter was not blind to the status of non-hypnotic reals, but was blind to whether hypnotic subjects were reals or simulators.

All hypnotic reals and simulators received the hypnotic induction procedure used in Experiment 1. In place of a hypnotic induction procedure, nonhypnotic reals were administered 2-min instructions adapted from Barber and Wilson (1977) that encouraged them to "think with" and become imaginatively involved in the suggestions. Following the hypnotic or think with instructions, all subjects received the same sequence of suggestions, EAT interview, and posttest questionnaire.

Suggestions and Trance Logic Tests

All subjects were administered four test suggestions in the following sequence: age regression, negative hallucination, positive visual hallucination, and amnesia. As in Experiment 1, the subjects were scored for

the presence or absence of trance logic responding only if they first passed the suggestion in question.

Age regression. The age regression suggestion, the criteria for scoring it as passed or failed, and the criteria for scoring incongruous writing were the same as in Experiment 1.

Negative hallucination. The subjects sat facing a plastic wastebasket that was positioned several feet away, between them and a small table upon which rested a book. Following Peters (1973), subjects were instructed to look at the wastebasket and were told that it was slowly disappearing. They were informed that the index finger of their right hand would rise as the wastebasket disappeared. Subjects were then asked to look around the room and describe what they saw. Finally, they were given the suggestion that the book on the table was too heavy to lift, and they were asked to walk to the table and try to lift the book. Subjects were scored as passing the negative hallucination suggestion if their finger rose 3 cm or more and if they failed to mention the wastebasket when describing what they saw in the room. Trance logic was indicated if they walked around rather than into the wastebasket while walking to or from the table.

Positive hallucination. This item was an expanded version of the hallucination suggestion used in Experiment 1. While the subjects' eyes were closed, the toy moose was removed from view and placed on a stool on the subjects' opposite side. The subjects were instructed to open their eyes and "see" the moose, and were again informed that their finger would rise as their image became clearer. After their finger had risen, the subjects were queried about several features of the hallucinated toy (e.g., How would you describe its facial features?). During this inquiry, the experimenter indicated that the toy was leaning to one side and instructed subjects to set it upright. Afterward, the subjects were asked to describe the hallucinated toy in as much detail as possible.

After subjects had completed their descriptions the experimenter pointed to the actual toy on the stool and asked, "What is that on your right, over there on the stool?" If subjects correctly identified the toy they were further asked, "How can that be? Can you explain?"

Subjects passed the suggestion if they (a) lifted their finger 3 cm or more, (b) described the toy as having an external location, and (c) set the hallucinated toy upright when instructed to do so. Subjects were scored as exhibiting the double hallucination response if they indicated seeing the actual toy and the imagined toy simultaneously.

Recall amnesia. The subjects were presented orally with a list of five unrelated, high imagery words taken from Toglia and Battig (1978). The list was presented in a fixed order on three consecutive trials and, following the last presentation, the subjects were given a 30-s oral recall trial. Next, the subjects were given a suggestion informing them that they would be unable to remember any of the words. The suggestion was followed by a challenge to try and remember and another 30-s recall trial. Finally, the amnesia suggestion was cancelled and subjects were given a last 30-s recall trial. Amnesia was measured as the difference between the number of words correctly recalled during the amnesia period minus the number recalled after cancellation of amnesia. The subjects passed the suggestion if they exhibited amnesia for at least one item. Amnesics were then divided into those who showed complete amnesia (failed to recall any items during the suggestion period) and those who showed partial amnesia.

EAT Interview and Questionnaire

The format for the EAT interview was the same as in Experiment 1, and the questions concerned with age regression were similar to those used in Experiment 1. The EAT for the positive hallucination began by asking subjects for a detailed description of what they experienced during the suggestion period. Following their response to this general question, the subjects were explicitly asked if, at the time, they could see the curtain through the toy. During the portion of the EAT concerned with

the negative hallucination suggestion, subjects were asked whether the wastebasket had disappeared completely.

Subjects were scored as exhibiting incomplete responding to age regression if they reported any failure to experience the effects suggested. Incomplete responding was defined more inclusively than was duality in Experiment 1. For instance, the report "I didn't really feel like I was five" was defined as an incomplete response but would not have been defined as a duality response in Experiment 1.

Subjects were scored for incomplete responding to the positive hallucination suggestion if their description of the hallucinated object was qualified with words or phrases such as "fuzzy," "not all there," and "doesn't seem real." Descriptions of the hallucinated object as transparent were not counted as evidence of incompleteness. Instead, the subjects were scored as exhibiting spontaneous transparency if their EAT response to the general question included the word "transparent," or if subjects explicitly stated that they could see through the object or see only the outline of the object. Subjects were scored as exhibiting cued transparency if they responded affirmatively when asked explicitly if they could see the curtain through the toy.

Subjects were scored as responding incompletely to the negative hallucination suggestion if they reported that the wastebasket had not disappeared completely or if they reported its partial or complete disappearance and reappearance. Interrater agreement was 88% for incomplete age regression, 90% for incomplete positive hallucination, 100% for spontaneous transparency, 94% for cued transparency, and 93% for incomplete disappearance of the wastebasket. Discrepancies were resolved through discussion.

Following the EAT, the subjects were administered a questionnaire that assessed their degree of subjective response to each suggestion on a 4-point scale. The wording of the questionnaire items and its scoring were the same as in Experiment 1.

Results

Passing suggestions. As predicted by the differential demands hypothesis, chi-square tests indicated that hypnotic and nonhypnotic reals failed to differ significantly in their frequency of passing suggestions for age regression, negative hallucination, positive hallucination, and amnesia (all $ps > .10$). Similarly, chi-square tests also indicated that high and low susceptible simulators failed to differ significantly in their frequency of passing any of these suggestions (all $ps > .10$). In order to enhance power, the two groups of real subjects were combined and compared with the combined simulators in their response to each suggestion. As Table 3 shows, reals and simulators failed to differ in their rate of passing the age-regression suggestion. However, simulators were more likely than reals to pass the positive hallucination, negative hallucination, and amnesia suggestions.

Trance logic tests. Chi-square tests indicated that hypnotic and nonhypnotic reals failed to differ significantly in showing incongruous writing in age regression, avoidance of the "missing" wastebasket, transparent hallucinating, and the double hallucination response (all $ps > .10$). High and low simulators also failed to differ from each other in the frequency with which they exhibited any of these responses (all $ps > .10$). The two groups of reals were combined and compared with the combined simulators on frequency of trance logic responding. As shown in Table 4, reals were significantly more likely than simulators to display incongruous writing and cued transparent hallucinating. However, reals and simulators failed to differ significantly on avoidance of the "missing" object or the double hallucination response.

Table 3
Frequency of Responses to Suggestions
for Simulators and Reals

Suggestion/Response	Simulators	Reals	χ^2	p
Age regression			2.23	ns
Pass	30	39		
Fail	0	3		
Negative hallucination			21.22	<.001
Pass	27	15		
Fail	3	27		
Positive hallucination			3.89	<.05
Pass	25	26		
Fail	5	16		
Amnesia			9.21	<.001
Pass	28	26		
Fail	2	16		

Only 4 (15%) of the real subjects who passed the hallucination suggestion and 1 (4%) of the simulators exhibited spontaneous transparency. All of the subjects who exhibited spontaneous transparency also exhibited cued transparency. Because the rate of spontaneous transparency was so low, this phenomenon is not discussed further.

Incomplete responding. Incomplete responding was assessed independently of trance logic responding to the age regression, positive hallucination, negative hallucination, and amnesia suggestions. Hypnotic and nonhypnotic reals showed no significant differences in incomplete responding to any of the suggestions (all $ps > .10$). High and low susceptible simulators also failed to differ significantly in incomplete responding to any of these suggestions (all $ps > .10$). Importantly, however, the combined reals showed significantly more incomplete responses to each of these suggestions than did the combined simulators (see Table 5).

Response completeness, subjective experience and trance logic. The responses of hypnotic and nonhypnotic reals to each suggestion were scored trichotomously as (a) passed completely (scored 3), (b) passed incompletely (scored 2), and (c) failed (scored 1). A total response completeness index was computed for each real subject by summing their completeness responses to each suggestion. As predicted by the differential demands hypothesis, total completeness correlated significantly and in a negative direction with incongruous writing in age regression, $r(38) = -.34$, $p < .02$, and with transparency, $r(25) = -.36$, $p < .03$ (one-tailed). On the other hand, the correlation between total completeness and the double hallucination response, $r(25) = .02$, and total completeness and avoidance of the missing object, $r(15) = -.02$, did not approach significance.

The pattern of correlations between total subjective responding and trance logic indexes was also consistent with the differential demands hypothesis. Thus, total subjective responding correlated significantly and in a negative direction with both incongruous writing, $r(36) = -.37$, $p < .05$, and transparency, $r(24) = -.42$, $p < .02$. However, total subjective responding failed to correlate significantly with either the double hallucination response, $r(25) = -.10$; or avoidance of the "missing" object, $r(15) = -.15$. Total completeness and total subjective re-

sponding correlated significantly with one another, $r(39) = .57$, $p < .001$.

General Discussion

Hypnotic and Nonhypnotic Reals

As in previous studies (Spanos, Bridgeman, et al., 1983; Spanos, de Groot, et al., 1985), hypnotic and nonhypnotic reals in Experiment 2 failed to differ from one another on any trance logic index, and high and low susceptible simulators also failed to differ from one another in this regard. The finding that hypnotic and nonhypnotic reals exhibited equivalent levels of trance logic responding is consistent with a large body of data (cf. Barber, 1969; Spanos, 1986) indicating that subjects in these two groups also perform equivalently on other types of test suggestions (e.g., suggestions for analgesia, auditory hallucination, limb catalepsy). These findings provide strong support for social psychological accounts of hypnotic responding and provide evidence against the notion that hypnotic procedures produce unusual cognitive changes (e.g., a trance state) that facilitate responsiveness to suggestions. Nevertheless, some special process theorists (e.g., Orne, Dinges, & Orne, 1986) attempt to account for similar patterns of responding in hypnotic and nonhypnotic control subjects by contending that the controls inadvertently slipped into hypnosis.

As has been pointed out repeatedly (e.g., Barber, 1969; Spanos, 1986), this account is obviously post hoc and provides no criterion for distinguishing hypnotic and nonhypnotic behavior. Consequently, if taken seriously, this account leads to the conclusion that people are inadvertently hypnotizing some others whenever they teach, provide psychotherapy, make helpful suggestions, give directions, ask probing questions, and so on. The fact that special process theorists typically invoke this account only when attempting to dismiss findings that are incongruent with their theoretical formulations attests to its serious limitations as an adequate explanation (Spanos, 1986).

Table 4
Incidence of Trance Logic in Simulators
and Reals for Each Response Item

Item/trance logic	Treatment		χ^2	p
	Simulators	Reals		
Incongruous writing			21.64	<.001
Yes	2	24		
No	28	15		
Negative hallucination			0.47	ns
Yes	19	9		
No	8	6		
Double hallucination			0.08	ns
Yes	20	20		
No	5	6		
Spontaneous transparency			1.86	ns
Yes	1	4		
No	24	22		
Cued transparency			5.67	<.025
Yes	9	18		
No	16	8		

Table 5
Incidence of Incomplete Responses by Simulators and Reals for Each Response Item

Item/Incompleteness	Treatment		χ^2	<i>p</i>
	Simulators	Reals		
Age regression			11.23	<.01
Yes	14	33		
No	16	6		
Negative hallucination			5.49	<.05
Yes	12	13		
No	15	2		
Positive hallucination			4.46	<.05
Yes	8	16		
No	17	10		
Recall amnesia			12.46	<.01
Yes	6	18		
No	22	8		

Real/Simulator Differences

In both Experiments 1 and 2, and in several other studies (e.g., Nogrady et al., 1983; Spanos, de Groot, et al., 1985), reals exhibited transparent hallucinating and incongruous writing significantly more often than did simulators. In Experiment 2, reals and simulators failed to differ on the double hallucination response or in avoidance of the "missing" object. These two trance logic indexes have consistently failed to differentiate reals from simulators in other studies as well (e.g., Peters, 1973; Spanos, de Groot, et al., 1985).

The pattern of real-simulator effects obtained in Experiment 2 cannot be accounted for by the logical incongruity hypothesis. On the contrary, that hypothesis predicts (incorrectly) that all trance logic indexes will differentiate reals from simulators. On the other hand, the differential demands hypothesis predicts that trance logic indexes will differentiate reals from simulators when those indexes also assess incomplete responding. One implication of this hypothesis is that reals would respond incompletely to suggestions more often than would simulators. Both of these experiments provide clearcut support for this idea. For instance, in Experiment 1, the simulators were more likely than reals to describe their suggested experiences as believed in and more likely to describe fine details in their hallucinated object. Similar findings were also obtained by Spanos, Bridgeman, et al. (1983) and Stanley et al. (1986). In Experiment 2, the simulators passed the positive hallucination, negative hallucination, and amnesia suggestions more often than did reals. Moreover, among subjects who passed suggestions, simulators were more likely than reals to exhibit a complete response to the age-regression, positive hallucination, negative hallucination, and amnesia suggestions.

Individual Differences

Among the reals in both Experiments 1 and 2, measures of response completeness correlated negatively with trance logic responding on indexes that differentiated reals from simulators. Thus, in Experiment 1, reals who exhibited duality, incongruous writing, and transparency were less likely than those who

did not exhibit such responses to report believing in the suggested situation, to become absorbed in suggestions, and to report intense subjective experiences in response to suggestions. Relatedly, in Experiment 2 total subjective responding in reals correlated significantly and in a negative direction with incongruous writing and transparent hallucinating (the two trance logic indexes that, in Experiment 2, differentiated reals from simulators). Along similar lines, the response completeness index correlated significantly and in a negative direction with incongruous writing and transparent hallucinating. Importantly, in Experiment 2 neither total subjective responding nor the response completeness index correlated significantly with avoidance of the "missing" object or the double hallucination response (the two trance logic indexes that failed to discriminate between reals and simulators).

In response to those trance logic items that successfully differentiated between reals and simulators, the reals who exhibited trance logic reported less compelling subjective experiences than did the reals who did not exhibit trance logic. These findings suggest that reals who reported solid hallucinations and complete age regression probably experienced suggested imagery that was more vivid, intense, and of longer duration than did the reals who reported transparent hallucinations and incomplete age regression. Findings consistent with this idea were obtained in several earlier studies. For instance, Stanley et al. (1986) found that hypnotic reals who exhibited transparent hallucinations reported significantly less vivid visual imagery than did those who reported solid hallucinations. Relatedly, Spanos and Stam (1979) found that the vividness, degree of opacity, and duration of suggested visual hallucinations were highly intercorrelated ($r_s \geq .80$) in nonhypnotic reals. Taken together, these findings suggest the following interpretation: Test suggestions call for experiences that are complete and lifelike. Consequently, highly suggestible reals muster whatever imaginal and absorptive abilities they have available in an attempt to generate the experiences called for by the suggestions. However, even among high susceptibles, there are wide individual differences in imaginal and absorptive abilities. Because suggestions contain tacit demands for honest reporting, many reals are reluctant to lie about their experiences. Therefore, to a substantial degree, variations in the intensity, completeness, and lifelike quality of the suggested imagery reported by these subjects reflects a variation in their ability to generate and become absorbed in task-relevant imagery (Spanos et al., 1976).

In summary, these findings, like those of several other recent studies (Spanos, Bridgeman, et al., 1983; Spanos, de Groot, et al., 1985; Stanley et al., 1986), provide strong support for the hypotheses that simulators tend to make more complete or "ideal" responses than do reals, and that trance logic indexes differentiate between the performance of reals and simulators when those indexes also measure incomplete responding. These findings also provide strong evidence against the logical incongruity hypothesis. Contrary to that hypothesis, not all trance logic items differentiate successfully between reals and simulators.

Implications

Much theorizing about hypnosis has been premised on the assumption that hypnotic reals and simulators are exposed to

the same demand characteristics. As we saw, this assumption led Orne (1959) to conclude that differences in trance logic responding between these groups resulted from variables other than demands that were unique to the subjects in the real condition. On the basis of the same reasoning, differences between reals and simulators in posthypnotic responding (Orne, Sheehan, & Evans, 1968), and source amnesia (Evans, 1979) have also been attributed to "hypnosis per se" rather than to demand characteristics. The present findings, along with those of other recent studies (Lynn, Nash, Carlson, Sweeney, Frauman, & Givens, 1985; Spanos, Bridgeman, et al., 1983; Spanos, de Groot et al., 1985; Stanley et al., 1986) indicate rather clearly that the assumption of equivalent demands in hypnotic and simulation conditions is incorrect. On the contrary, differences in the demand characteristics associated with these conditions seem to account not only for the differences in trance logic responding that emerge between these groups, but also for real/simulator differences on posthypnotic responding (Spanos, Menary, Brett, Cross, & Ahmed, 1987), source amnesia (Spanos, Gwynn, Della Malva, & Bertrand, 1985), and response to conflicting instructions (Lynn et al., 1985). In short, simulation instructions do not equate for demand characteristics, they profoundly alter demand characteristics. Consequently, performance differences between reals and simulators should not be used to make inferences about "demand free," "counter-expectational" or "essential" aspects of hypnotic responding.

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